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10/695,398	10/29/2003	Takeshi Sakamoto	1065.1034	6798

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STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER	
DIACOU, ARI M	

ART UNIT	PAPER NUMBER
3663	

DATE MAILED: 08/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/695,398	SAKAMOTO, TAKESHI	
	Examiner	Art Unit	
	Ari M. Diacou	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *29 October 2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 11 and 17 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claims 11 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: the apparatus performing the calculation, and its relationship to the rest of the components in the invention.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-10, 12-16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Onaka et al. (USP No. 6785042).

Regarding claim 1, Onaka discloses a wavelength-division multiplexing optical communication system in which an optical lossy medium, optical amplifiers and Raman amplifiers for compensating for loss in the optical lossy medium are cascade-connected, said system comprising: [Fig. 1] [Fig. 25]

means, which is provided in an optical amplifier, for correcting slope of a wavelength characteristic produced by wavelength-dependent loss of the optical lossy medium; [Fig. 1, #2] [Fig. 21, 22] [Col. 8, line 40 - Col. 9, line 17]

acquisition means for acquiring state of use of a Raman amplifier, at a node the same as that of the optical amplifier; [Fig. 1, #3] [The examiner considers the state of use to be the amplifier gain tilt]

and means for deciding, based upon the state of use of the Raman amplifier, whether or not to cause the optical amplifier to perform a slope correction. [Fig. 1, #4]

Regarding claim 2, Onaka discloses the system according to claim 1, wherein said acquisition means includes:

means for demultiplexing light of a monitoring control signal from main-signal light; [Fig. 40] [Col. 17, lines 7-12]

and means for acquiring, from the light of the monitoring control signal in a link opposing that of said optical amplifier, the state of use of a Raman amplifier at a node downstream of said optical amplifier. [Fig. 1, #4] [Fig. 40]

Regarding claim 3, Onaka discloses the system according to claim 1,

further comprising an external control unit for ascertaining the state of use of a Raman amplifier at each node based upon a monitoring control signal sent and received at each node together with main-signal light; wherein said acquisition means acquires, from said external control unit, state of use of a Raman amplifier at a node downstream of said optical amplifier. [Fig. 40] [Fig. 47, #4]

Regarding claim 4, Onaka discloses a wavelength-division multiplexing optical communication system in which an optical lossy medium, optical amplifiers and Raman amplifiers for compensating for loss in the optical lossy medium are cascade-connected, said system comprising: [Fig. 1, #25]

means, which is provided in an optical amplifier, for correcting slope of a wavelength characteristic produced by wavelength-dependent loss of the optical lossy medium; [Fig. 1, #2] [Fig. 21, 22] [Col. 8, line 40 - Col. 9, line 17]

acquisition means for acquiring state of flattening-control implementation which indicates whether a Raman amplifier is implementing control to flatten a wavelength characteristic at a node downstream of the optical amplifier, based upon the wavelength characteristic on an input side or output side of said optical amplifier connected to said Raman amplifier; [Fig. 1, #3]

and means for deciding whether or not to cause said optical amplifier to perform a slope correction based upon the state of flattening-control implementation by said Raman amplifier. [Fig. 1, #4]

Regarding claim 5, Onaka discloses the system according to claim 4, further comprising:

a spectrum analyzer for detecting the wavelength characteristic on an input side or output side of said optical amplifier connected to said Raman amplifier; [Fig. 19, #3G]

and means provided in the Raman amplifier for performing flattening control based upon the wavelength characteristic detected by said spectrum analyzer. [Col. 13, lines 6-19] [Col. 17, lines 48-67]

Regarding claim 6, Onaka discloses the system according to claim 1, wherein said acquisition means includes:

means for demultiplexing light of a monitoring control signal from main-signal light; [Fig. 40] [Col. 17, lines 7-12]

and means for acquiring, from the light of the monitoring control signal in a link opposing that of said optical amplifier, the state of flattening-control implementation at a node downstream of said optical amplifier. [Fig. 1, #4] [Fig. 40]

Regarding claim 7, Onaka discloses the system according to claim 4,

further comprising an external control unit for ascertaining the state of flattening-control implementation by a Raman amplifier at each node based upon a monitoring control signal sent and received at each node together with main-signal light; wherein said acquisition means acquires, from said external control unit, the state of flattening-control implementation by a Raman amplifier. [Fig. 40] [Fig. 47, #4]

Regarding claim 8, Onaka discloses a wavelength-division multiplexing optical communication system in which an optical lossy medium, optical amplifiers and Raman amplifiers for compensating for loss in the optical lossy medium are cascade-connected, said system comprising:

slope-correction control means, which is provided in a Raman amplifier, for correcting slope of a wavelength characteristic produced by wavelength-dependent loss of the optical lossy medium; [Fig. 1, #2] [Fig. 21, 22] [Col. 8, line 40 - Col. 9, line 17]

means for calculating amount of slope correction based upon amount of tilt of a wavelength characteristic of a transmission line produced between said Raman amplifier and a node at a receiving end; [Fig. 1, #3]

and means for setting the amount of slope correction in said slope-correction control means of said Raman amplifier; wherein slope correction is performed solely by said Raman amplifier. [Fig. 1, #4]

Regarding claim 9, Onaka discloses the system according to claim 8,

wherein said slope-correction control means calculates amount of tilt of a wavelength characteristic at an input section of each optical amplifier and calculates a necessary amount of slope correction from this amount of tilt. [Fig. 1, #4]

Regarding claim 10, Onaka discloses the system according to claim 8,

wherein there is provided a spectrum analyzer for detecting a wavelength characteristic at an input section of each optical amplifier; [Fig. 19, #3G]

and said slope-correction control means calculates amount of tilt of a wavelength characteristic at an input section of each optical amplifier based upon result of detection by said spectrum analyzer, and calculates a necessary amount of slope correction from this amount of tilt. [Fig. 1, #4]

Regarding claim 12, Onaka discloses the system according to claim 8, further comprising:

a spectrum analyzer for detecting a wavelength characteristic at an input section of an optical amplifier; [Fig. 19, #3G]

and a flattening controller provided in a Raman amplifier for flattening a wavelength characteristic detected by said spectrum analyzer; wherein a slope correction is performed by adding amount of correction by flattening control to amount of correction by slope-correction control. [Fig. 1, #4]

Regarding claim 13, Onaka discloses a wavelength-division multiplexing optical communication system in which an optical lossy medium, optical amplifiers and Raman amplifiers for compensating for loss in the optical lossy medium are cascade-connected, said system comprising: [Fig. 1, #25]

> slope-correction control means, which is provided in a Raman amplifier, for correcting slope of a wavelength characteristic produced by wavelength-dependent loss of the optical lossy medium; [Fig. 1, #2]
>
> and means for calculating amount of slope correction by the Raman amplifier by subtracting, from an overall amount of tilt of a wavelength characteristic produced between said Raman amplifier and a node at a receiving end, an amount of slope correction by optical amplifiers that exist between said Raman amplifier and said node, and setting the calculated amount of slope correction in said slope-correction control means; wherein said Raman amplifier performs a slope correction based upon the set amount of slope correction. [Fig. 1, #3] [Col. 13, line 48 - Col. 14, line 14]

Regarding claim 14, Onaka discloses a wavelength-division multiplexing optical communication system in which an optical lossy medium, an optical amplifier and a Raman amplifier for compensating for loss in the optical lossy medium are cascade-connected, said system comprising: [Fig. 1, 25]

> slope-correction control means, which is provided in each of an optical amplifier and Raman amplifier wherein amount of slope correction is limited, for correcting

slope of a wavelength characteristic produced by wavelength-dependent loss of the optical lossy medium; [Fig. 1, #2]

and means for acquiring information concerning wavelength-dependent loss of the optical loss medium between nodes and amount of slope correction by each optical amplifier and Raman amplifier, calculating from this information and amounts of slope correction an amount of tilt of a wavelength characteristic at an input section of each optical amplifier, deciding amounts of slope correction by optical loss compensators in order from an upstream side using the amount of tilt, and repeating the above control with respect to a downstream node when the amount of slope correction has exceeded the capability of an optical loss compensator, thereby deciding and setting amount of slope correction by each optical loss compensator; wherein said optical loss compensator performs a slope correction using the set amount of slope correction. [Fig. 1, #3]

Regarding claim 15, Onaka discloses the system according to claim 14, further comprising:

a spectrum analyzer for detecting a wavelength characteristic at an input section of the optical amplifier; [Fig. 19, #3G]

and a flattening controller provided in a Raman amplifier for flattening the wavelength characteristic detected by said spectrum analyzer; wherein the slope correction is performed by adding the amount of the slop correction control and the amount of the flattening control. [Fig. 1, #4]

Regarding claim 16, Onaka discloses the system according to claim 14,

> wherein there is provided a spectrum analyzer for detecting a wavelength characteristic at an input section of each optical amplifier; [Fig. 19, #3G]
>
> amount of tilt of a wavelength characteristic at an input section of each optical amplifier is calculated based upon result of detection by said spectrum analyzer. [Fig. 1, #4]

Regarding claim 18, Onaka discloses the system according to claim 14, wherein correction of calculated amount of tilt is performed not only by optical amplifiers and Raman amplifiers but also by devices such as gain equalizers inserted into said system. [Col. 2, lines 19-38]

6. While patent drawings are not drawn to scale, relationships clearly shown in the drawings of a reference patent cannot be disregarded in determining the patentability of claims. See In re Mraz, 59 CCPA 866, 455 F.2d 1069, 173 USPQ 25 (1972).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 11 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka as applied to claims 1-10, 12-16 and 18 above, and further in view of Seydnejad et al. (USP App. No. 09/873,389). Onaka discloses a gain-flattening Raman amplifier as described in claims 10 and 16, but fails to teach the use of interpolation by a cascaded optical amplifier in determining the gain profile of the node in question. Seydnejad teaches a Raman amplifier control circuit that uses interpolation to calculate the correct gain for each channel of the incident signal [¶ 0012]. Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the

invention was made, to use interpolation in a Raman amplifier control circuit to calculate the correct gain profile of that node, for the purpose of reducing the efficiency of calculation performed by the Raman amplifier controller.

Conclusion

11. The prior art which is cited but not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ari M. Diacou whose telephone number is (571) 272-5591. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMD 7-28-2005

JACK KEITH
PRIMARY EXAMINER
SPE 3663